Table 15 Summary of ML-based Resource Allocation

Ref.	ML Technique	Network	Dataset	Features	Output	Evaluation	
						Settings	Results
Baldo et al. [35]	Supervised: · MLP-NN	Wireless networks	Simulation data generated using ns-Miracle simulator	· Signal to noise ratio · Received frames · Erroneous frames · Idle time	· Throughput · Delay · Reliability	2 layers with 6 neurons in the hidden layer	Very good accuracy
Bojovic [65]	Supervised: · MLP-NN	Wireless LAN	Synthetic data generated using testbed	· Signal to noise ratio · Probability of failure · Business ratio · Average beacon delay · Number of detected stations	· Throughput of an access point	2 layers with varying number of nodes in the hidden layer, maximum number of epochs, and learning rate	NRMSE = 8%
Adeel et al. [6]	RNN with GD, AIWPSO, and DE	Cellular network	Synthetically generated using a SEAMCAT LTE simulator	· Signal to interference noise ratio · Inter-cell-interference · Modulation/coding schemes · Transmit power	Throughput	5-8-1[a]	Mean square error · AIWPSO: 8.5×10^{-4} · GD: 1.03×10^{-3} · DE: 9.3×10^{-4}
Testolin et al. [443]	Supervised: · Linear classifier Unsupervised: · RNN	Wireless networks	38 video clips taken from CIF	· Video frame size	· Quality level of each video in terms of the average SSIM index	32 visible units with a varying number of hidden units	RMSE < 3%
Mijumbi et al. [312]	RL · Q-learning (ϵ-greedy and softmax)	VNs	Simulation on ns-3 and real Internet traffic traces	States · Percentages of allocated and unused resources in substrate nodes and links	Actions · Increase or decrease the percentages of allocated resource	2^9 states, 9 actions	Improved the acceptance ratio
Mijumbi et al. [313]	Supervised: · FNN	VNF chains	VoIP traffic traces	· Dependency of resource requirements of each VNFC on its neighbor VNFCs · Historical local VNFC resource utilization	· Resource requirements of each VNFC	2 NNs for each VNFC	Accuracy ∼90%
Shi et al. [410]	Supervised: · MDP · BN	VNF chains	Simulation data generated using WorkflowSim	· Historical resource usage	· Future resource reliability	Running time for MDP: $O(t^{v+1})$, where t and v stand for the number of NFV component tasks and the number of VMs, respectively	Better than other greedy methods in terms of cost

[a] Number of neurons at the input layer, hidden, and output layers, respectively